THE TRADE REVIEW
—AND—
WESTERN MACHINIST.

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NEW MACHINERY.

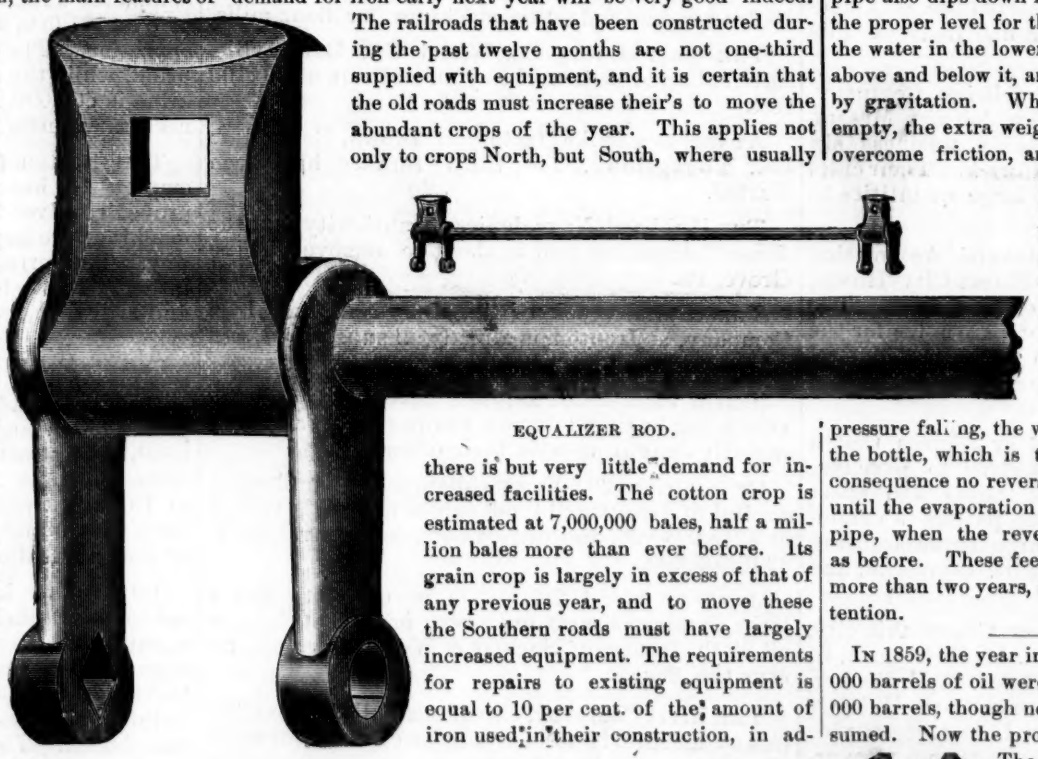
EQUALIZERS FOR SIDE-SPRING BUGGIES.

The accompanying cut represents a new equalizer rod and shackles complete, for side-spring buggies. The object of the rods is to make that kind of wagon ride level,—a person sitting on one side of the seat, the weight is equalized on both springs. These rods are made of Bessemer steel, and the shackels of malleable iron. Carriage makers will see at once the advantage in this device. These rods are now being made in large quantities by I. N. Topliff, of this city, the manufacturer of the Bow Socket and specialties in carriage hardware.

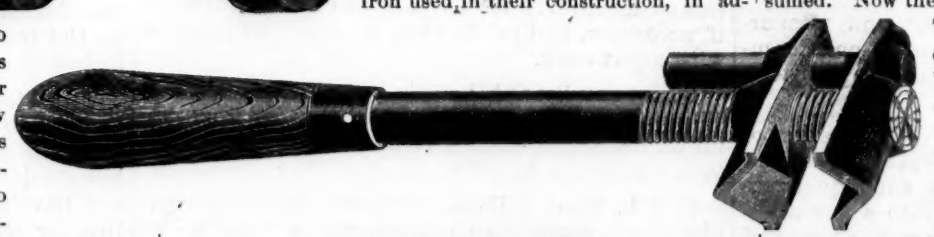
MITCHELL'S PATENT ADJUSTABLE SOCKET WRENCH.

A wrench that can be adapted to any sized nut; that will hold the same in the socket jaws when removed; that will re-adjust the nut without removal from the socket, thus obviating the soiling of hands, and finally, that can be applied not only to carriages, but also to car and other wheels as well as to overhead work, has long been needed among mechanical trades. Such a desideratum has been supplied in Mitchell's Patent Adjustable Socket Wrench, manufactured by Bowker & Tripp, of New Bedford, Mass., herewith illustrated.

The cut scarcely needs explanation, the main features of the device showing for themselves. Twelve different sizes are manufactured. It is eminently satisfactory in working, and is coming into general use by railroads, manufactories, founderies, mills, and other establishments, and for the purposes above indicated it is hard to equal. Bowker & Tripp also manufacture spinning, brittania metals, shoe machinery, steam engines and the Dana centrifugal-governor windmill. Their works are running actively on orders for their different products, and the demand, especially for their wrenches, is widening, and they promise to come into general use, especially among carriage manufacturers.



EQUALIZER ROD.



ADJUSTABLE SOCKET WRENCH.

Doing Away With Puddling.

Mr. Frank J. Hearne, a prominent mill manager of Wheeling, Va., says: "To do away with puddling, the only method to be pursued by the syndicate is to use a low grade of open hearth or Bessemer steel in making nails. This movement has been started by the nail manufacturers of Wheeling, and my object in being in this city is to further their plan. I have had numerous blows of soft steel made at the Bessemer Steel Works at Braddock's and each blow accurately annalyzed. This soft steel has been made into nail plate and quietly slipped into the Wheeling mills, and cut into nails, without the nailers being able to discover the difference between it and common nail iron. Our reason for doing this was to see whether steel would make nails. The results of our experiments have been entirely satisfactory, and we are now satisfied that we can make nails out of soft steel cheaper and of a better quality for their weight than it was possible to do with the best puddled iron. We calculate in Wheeling that we make about one-seventh of the nails made in the United States. Over 5,000 puddlers are employed in puddling the iron which we put into nails. These will all be thrown out of employment unless they see fit to work at some other branch of labor. I am in this city now placing contracts where they may be concluded at any time most suitable to the Wheeling syndicate, for all of the necessary equipments to be found in a first-class Bessemer works. This is no small affair. The syndicate have an unlimited command of money, and will break ground in January for the new works. This output the syndicate will divide up into consignments, according to the capacity of the different nail mills represented in the syndicate, and each will get its allotment of so many carloads of steel nail-plate per day from the Bessemer mill. The principal mills in the Wheeling district are connected with the new enterprise."

THE LOW PRICE OF IRON

Entirely Uncalled For.—Manufacturers Meet in Pittsburgh Dec. 20.

The committee appointed at a recent meeting of the iron manufacturers in Pittsburgh, have issued a circular letter calling for a general meeting of the iron manufacturers to be held in Pittsburgh on the 20th inst. They consider the present low prices of iron entirely uncalled for, and proceed to prove this as follows:

"Trade is fairly active, and the mills reasonably busy filling orders that come in, which are absolutely required for immediate consumption. Stocks are not accomulating in the hands of manufacturers, dealers or consumers, and it was developed that there was more inquiry for the future than was expected. It seems reasonably certain that the demand for iron early next year will be very good indeed. The railroads that have been constructed during the past twelve months are not one-third supplied with equipment, and it is certain that the old roads must increase their's to move the abundant crops of the year. This applies not only to crops North, but South, where usually there is but very little demand for increased facilities. The cotton crop is estimated at 7,000,000 bales, half a million bales more than ever before. Its grain crop is largely in excess of that of any previous year, and to move these the Southern roads must have largely increased equipment. The requirements for repairs to existing equipment is equal to 10 per cent. of the amount of iron used in their construction, in addition to the new needed. In addition to these, the demand for iron for agricultural purposes and the general trade of the country, in view of the immense immigration, good crops and extension of settlements, must be larger this year than ever before. All these facts show the encouraging prospect for next year and the uselessness of the present scare. This scare was, no doubt, due to the published reports as to the condition of the steel rail industry; but the fear of stoppage in this is over. Contracts for 200,000 tons of rails were placed this week; large orders were on the market anxious to be booked, but makers are not anxious to enter them at the same rates. Orders for a large number of locomotives have been placed within three weeks. Fifty-five by the Pennsylvania Railroad, fifty by a western road, and some of the larger concerns are so well supplied with orders up to April as to be unable to book any for delivery until after that date. Large contracts for cars have been placed, and it is well known that still larger ones are ready to be offered, and this in view of the fact that at this season of the year railroads are bears when campaigning for supplies for the ensuing season. In view of these facts, and in the belief that if the actual state of the trade was fully known it would remove the tendency to lower prices and enable us to get a fair price for our iron, the meeting decided unanimously to call a general conuention of Western manufacturers for Wednesday, Dec. 20, 1882, at 10:30 a. m., at the Western Iron Association's rooms, Pittsburgh, Pa."

The Fromentin Boiler Feeder.

This is a very ingenious attempt by a French engineer, to solve the problem of automatic boiler feeding. There are two equal bottles of copper, attached to each end of a horizontal lever, which rocks upon a shaft. Fixed to the lever, but loose on the shaft, is a faced cast iron disc, also with ports, and in contact with the former. The ports are so arranged that the lower of the two see-sawing discs is open to the boiler and closed to the feed (which may be an overhead tank or a town main), while the higher is closed to the feed but open to the boiler. From the pipe of the lower a pipe also dips down into the boiler ending at whatever is the proper level for the water inside. This pipe being open the water in the lower bottle has the steam pressure both above and below it, and consequently runs into the boiler by gravitation. When, however, it is about two-thirds empty, the extra weight in the other bottle is sufficient to overcome friction, and causes a reversal of the two, the bottle which was lower is now open to the feed and begins to fill, while the other is open, both at top and bottom to the boiler, and begins to empty. This goes on until the water rises high enough to seal the bottom of the dip pipe. The steam above the lower bottle, being now cut off from that in the boiler, begins to condense, and the pressure falling, the water from the boiler rushes up to fill the bottle, which is thus prevented from emptying. In consequence no reversal takes place, and the feed is stopped until the evaporation lowers the level so far as to unseal the pipe, when the reversal follows, and the feeding goes on as before. These feeders have been at work in Paris for more than two years, and have attracted a good deal of attention.

In 1859, the year in which the first oil well was sunk, 2,000 barrels of oil were produced. The year following 500,000 barrels, though not more than one-half of it was consumed. Now the production is about 90,000 barrels a day. The consumption and exports have been constantly increasing, but they have not kept pace with production. Some idea of the immense proportions which this industry has assumed may be gathered from the fact that since the first well was opened in 1859 not less than $1,500,000,000 has been added to the wealth of the country in the value of the crude oil and its products. In 1881 the value of the exports of petroleum and its products reached $40,315,609, which was second only to cotton and cereals.

Norfolk, Va., is the largest peanut market in the world, except Marseilles, France. Besides numerous commission houses where they are handled, it has two large cleaning establishments which employ some 200 hands and have a capacity for cleaning about 1,000 bushels per day.

The Cleveland Trade Review is one of the ablest and most interesting of trade papers and is a journal that shows renewed vigor and enterprise with every number.—[Pittsburgh Telegraph.

MANUFACTURES.

TO MACHINISTS, MANUFACTURERS AND OTHERS.

THE publishers of THE TRADE REVIEW solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinist and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own anguage, as all such contributions will be properly revised before sending to press.

☞ The TRADE REVIEW'S telephone number is 1,916.

OHIO INDUSTRIES.

CLEVELAND.

MYERS, Osborn & Co. are building a japanning oven in a new brick building, 20x40 feet; and another building, 60x80 feet, for mounting gasoline stoves.

ROLLING from very thick ingots direct to plates has been introduced at the Otis works, and an advantage over the issue of smaller thickness in quality of plate as well as in economy of manufacture is found.

A SECRET meeting of bolt makers doing business in this city, Pittsburgh, Chicago, and elsewhere, was held at the Kennard House last week. The object was to compare prices and establish rates for the comiug season.

THE Hamilton Works of Wm. Tod & Co. are engaged in filling an order for a 10-horse-power engine and seven inch train of rolls, for Messrs. Atkins & Clark, of the Forest City Iron Works, Cleveland, says the Youngstown *News-Register*.

THE Standard Tool Co., with a capital of $100,000, and backed by capitalists of Cleveland, with W. A. Babcock, formerly with Morse Twist Drill Co., as general manager, has started the manufacture of twist drills and other fine tools in this city.

THE Cleveland Diamond Fire Brick Company, Newburgh, the proprietors of which are Messrs. Wright & Knowles, have been in business six years. Their specialty is No. 1 brick. Their chief business is local, but they ship large quantities to Chicago and the eastern cities.

THE Western Sewer Pipe Makers' Association held its annual meeting at the Forest City House, on Tuesday and Wednesday of this week. The object of the meeting was to compare notes for the coming season and to maintain the harmonious relations which have heretofore characterized the association.

THE St. Louis *Age of Steel* announces that a strong combination is being formed to purchase and operate zinc works at St. Louis and other points in the West. Among the parties in combination are said to be several large manufacturing concerns of St. Louis, Cincinnati, Cleveland, and other cities East.

OF the Empire Manufacturing Co., of this city, incorporated last Monday, Gen. M. D. Leggett, C. S. Haley, L. L. Leggett, T. A. Haley, C. H. Booker, and J. F. Hughes are directors; C. S. Haley is president and general manager; L. L. Leggett vice president, and T. A. Haley secretary and treasurer. The company will operate works on Champlain street for the manufacture of cooking butters, oleomargarine, petrolia, etc.

MR. I. N. TOPLIFF, near the C. & P. crossing of Euclid avenue, manufacturer of oval tubular bow sockets, bows, thin iron washers and equalizers for side springs—has just moved into a new addition 90x26 to 30, to be used for ware-room and shipping. He now employs 50 men, making full time with full force, and will increase the number when the season opens. Orders for the next season's trade are coming in rapidly, even more so than last season.

BY the recent erection of a 40x60 addition to their molding room, the Cleveland Stove Co. have increased their capacity 50 per cent. They have also lately purchased additional ground room, 20x100 feet. Their flooring reaches a total of over 72,000 square feet. When running full force, they employ 125 men. Trade during the past month has been in advance of that of the corresponding month of last year. The different departments are systematically arranged, and the various floors present a perfect wilderness of stoves of all kinds and sizes.

THE Hotchkiss & Upson Co., bolt manufacturers, since their occupancy of the former works of Lamson, Sessions & Co., at the junction of the C., C., C. & I. and N. Y., P. & O. railroads, have put in from $3,000 to $4,000 worth of new machinery and are employing about 150 men and boys. They make all kinds of machine, plow, carriage and elevator bolts, as well as large bolts for bridge purposes. C. A. Hotchkiss is president; A. S. Upson, treasurer, and Samuel Frisbee, secretary. This is a pushing company and it is winning deserved success.

WARNER & SWASEY, whose compactly arranged and well-lighted works are located on East Prospect street near the C. & P. crossing, have just received a Grant & Bogart 18-foot 26-inch lathe, with tapering attachment. It weighs 8,000 pounds and is of very handsome pattern. The firm have also just put in a Pratt & Whitney planer, a milling machine and other tools. Orders are plenty, and the force of 35 men is being constantly increased. They are now working on a 40-foot dome for the University of Virginia, near Charlottsville, having established an enviable reputation for the manufacture of scientific appliances.

OHIO IN GENERAL.

MANSFIELD offers a site for an oatmeal mill.

CINCINNATI produces over $5,000,000 worth of furniture annually.

DURING November the Akron Iron Co. did the largest business in its history.

THE work of building the Spaulding Iron Works, at Brilliant, is progressing rapidly.

THE Nickel Plate Carpet Sweeper is a recent production of the Ashtabula Shaft and Bolt Co.

C. S. RIDER, Canton, has been granted a patent on his gradual reduction machines for flour mills.

THE West Mining Car Wheel Co., Barnesville, have enlarged their works by an addition of 20x100 feet.

AT the new spike factory of Brown, Bonnell & Co., Youngstown, the third furnace has been started.

THE Hubbard *News* denies by authority that the Jesse Hall rolling mill is about to remove to Pine Grove, Pa.

THE capital stock of the Kelly Nail and Iron Company, at Ironton, is already all subscribed, and active work will soon begin.

SMITH, Vaile & Co., Dayton, have been doing a very large business during the past year and but recently caught up with their orders.

OHIO, with 20,699 establishments, employs a capital of $188,939,614, consumes materials valued at $215,098,026, and turned out products valued at $348,305,390.

ALREADY about 200 yards of oil cloth and a large number of mats have been printed at the new oil cloth factory of Sackett & Woods, Akron. So says the *Beacon*.

THE Rivet Company, Cuyahoga Falls, are putting in new machinery to increase the capacity for work if necessary, and to do away as much as possible with night work.

DEARDORF Bros. & Leffel's Bicycle, Tricycle, and Wheelbarrow Works, Springfield, burned Tuesday night, from spontaneous combustion. Loss, $36,000; insurance, $20,000.

F. & L. KAHN & BROS., of Cincinnati, have completed the extensive enlargements to their works at Hanging Rock, and are now employing 80 molders and a force of 155 hands.

LAST Friday, two months after its destruction by fire, Knapp & Whitsell's pottery, Akron, resumed operations. The new building is 48x154 with an engine room 48 feet square.

THE Youngstown Stove Co. employ thirty-eight hands, and turn out twenty cook stoves daily, besides parlor and heating stoves. A new parlor cook is called the "Arcade."

JOSEPH Corns & Son's Massillon rolling mill is not experiencing any of the dullness of the iron trade. The firm are running on yearly contracts and enjoy a large and permanent patronage.

C. AULTMAN & Co., of Canton, have concluded negotiations for the lighting of their extensive establishment by electricity, and an Edison machine will be in operation before the end of the year.

MR. SCHUMACHER will build an engine-house in the open space between his mammoth new mill and German mill, thus making a solid building front of mills and elevator of fully 500 feet.—*Akron Beacon.*

THE November pay-roll of C. Aultman & Co., Canton Buckeye Mower and Reaper Works, was over $40,000; that of Aultman, Miller & Co., Akron, $45,723 to 775 regular employes, not counting helpers.

THE Akron Sewer Pipe Co., the pioneer sewer pipe men of the United States, are burning 25 car-loads of pipe each week, and expect soon to build two more kilns which will increase their capacity five car-loads per week.

REDWAY & BURTON, Cincinnati, employ 125 molders, and their force of 300 employes is exerted to the utmost to keep pace with their orders. They have in contemplation the construction of a huge five-story building to better facilitate their increasing trade.

THE Mansfield Bolt & Nut Co., organized last spring with a capital of $50,000, has been in operation since last September, employs 50 hands and has orders ahead that will necessitate an immediate enlargement of the capacity to from 50,000 to 60,000 per day.

THE Phœnix Iron Works, Ashtabula, have lately begun the manufacture of auger bits, said to be as complete and reliable as the Jennings bit. This addition to their product has necessitated the purchase of new machinery, and after the holidays they will add to their working force. They make 13 different sizes, from 4-16 to 16-16.

THE Jewett Brick Company, Akron, has just completed another fine Wintigar kiln, at an outlay of over $1,000, and now has the same ready for operation. The capacity of this kiln is 200,000 brick, while the combined capacity of their three kilns is 600,000. In addition to the new kiln the necessary sheds have also been erected.

THE Burton (Geauga county) Novelty Works employ 15 hands turning out Van Riper's improved revolver rake. At the machine shop three machines are kept busy working sixteen hours per day. The principal work is skeins and calhead lathes. In the foundry four molders are kept busy and still they are 30 days behind in their orders.

AKRON *Beacon*: Several Akron millers are negotiating for flouring mills out of town.——Kubler & Beck's new addition to their varnish works will probably be larger than at first planned.——The machinery is being placed in position in the new Akron-Portage Strawboard Works. The battery of 10 boilers will be located in a few days. The shop will probably be running by January 1, 1883, or soon thereafter.

THE Akron Iron Co. shipped, Wednesday, two car-loads of their hot polished shafting to their agent on the Pacific Slope. The statement which appeared in the Boston *Commercial Bulletin* that Oakland, Cal., and Akron, Ohio, parties would build rolling mills at Oakland, Cal., is without foundation. The story probably found its origin in the fact that the Akron Iron Co. have established an exclusive agency for that slope.

THE Huber Manufacturing Co., Marion, have just completed an addition to their shops of a two-story brick building 40x120 feet. The company have enjoyed a very large trade the past season, and have found it necessary to increase their facilities for manufacture in order to keep pace with orders. The new building is to be used for a machine shop, and will be furnished with new and special machinery. They manufacture, on an extensive scale, farm and traction engines and vibrating steam threshers.

BARNEY & Smith Manufacturing Co., Dayton, are building some beautiful drawing room cars for the New York & Boston Short Line, and sleepers for the St. Paul, Minneapolis & Manitoba and Wisconsin Central roads. The Wisconsin Central cars are beauties, having solid mahogany finish inside. They are also building a great number o freight cars for the St. Paul, Minneapolis & Manitoba, Milwaukee, Lake Shore & Western, and othk roads. Buildings are being added to the wore

and three immense steam boilers are being put in. Everything about this great establishment indicates prosperity. The daily out put of the works is estimated at $10,000 in value. The number of men employed is over 1,200.

CINCINNATI is going to have another large white lead factory. The manufacture of white lead is carried on more extensively in the United States than in any other country. There are now three factories in this country—one in this city and two in St. Louis—of larger capacity than any in Europe which are devoted exclusively to the manufacture of white lead and red lead. It is expected that the new works in Cincinnati will be in running order by Nov. 1, 1883. The machinery will be run by a Corliss engine of 300-horse-power, having all the latest improvements, with the assistance of two smaller engines for special purposes. The factory will be 240x70 feet. The corroding factory will be three stories high, of brick.

THE prospects of the glass interests for Bellaire are represented as very promising. The Bellaire Window Glass Company contemplate increasing their capital stock from $100,000 to $200,000, with a view of converting the two eight-pot furnaces at their works into ten-pot furnaces, and build two more furnaces of ten pots each, making forty pots in all. This will make one of the largest window glass factories in the United States. The Ætna Glass and Manufacturing Company contemplate a modernized furnace on the site of the shop. This enterprise now employs about 200 persons, and if the contemplated addition is carried out, employment will be given to fully 450 persons. The new window glass factory is a fixed fact. It will be a big concern. At the Union Window Glass Works there is one ten-pot furnace. In the spring another ten-pot furnace will be added.

A TRADE REVIEW traveling correspondent, writing from Ravenna, says: The glass market is so low in window glass and chimneys, that a number of manufactories are making pressed glass or some other specialty. As in iron and steel, the manufacturers of specialties are getting the largest margins.——The Enterprise Glass Works are running six molds in pressed glass, making "sugars" and "creams." —— The Ravenna Flint Glass Co., (Limited), was incorporated last fall with a capital stock of $18,000, with this board of managers: Frank Wolcott, chairman; Wm. Grinnell, secretary and treasurer, and Theodore Creighton. The gentlemen who are the main stockholders are old experienced glass men and were formerly connected with the Enterprise Glass Works, of this place, and give their personal supervision to their product, thus assuring the quality of their product. The buildings of the company are located on the C. & P. Railroad, corner of Bowery and Pittsburgh streets. The main building is 65 feet square, mixing room 40 feet square, leavway building 12x50 and the packing room 12x50 feet. The buildings are located so as to afford unequaled facilities for receiving and shipping freight. The furnace, of brick, 75 feet high, is a novel one in the point that the fuel is all put in from below by the use of a patent teaser. The company are making only chimneys at present, and the distinction of these from any other factory here is that they make pure lead glass instead of lime glass. The chimneys are oil polished and annealed, thus making a superior chimney. Their capacity is 1,200 boxes a week, each box having six dozen chimneys, The works have 24 "shops" and eight "pots."—— Messrs. Wm. Haley & Co., who are at present known throughout the United States to glass men as manufacturers of superior molds for the making of glass, are about to establish a flint glass works for the manufacture of ornamental tableware and fine glass articles. They will have a capital stock of $30,000, and will make an extra fine grade of tableware. Ravenna indeed is growing and bids fair to be quite a glass center. Both of the new works are encouraged by the citizens, and this very quiet town of 4,500 people may yet turn itself into a thriving city.

NEW PROJECTS.

CANTON is figuring on a cork factory.

IT is rumored that Warren may get the Jamestown (N. Y.) Alpaca Mills.

THERE IS a possibility of the starting of a sand blast for decorating glass, at Akron.

ADJOINING STATES.

THE Stewart Iron Company's rolling mill at Sharon, Pa., has shut down for an indefinite period.

AT the Vulcan Brass and Iron Foundry, New Castle, Pa., recently transferred to new hands, a new foundry 50x50 feet has been erected for the turning out of heavy castings. Among other additions to the establishment are an air furnace costing $2,000, a core oven 26 feet in length and 12 feet wide, and a large lathe.

NEW Castle *Guardian:* Messrs. Witherow & Gordon have begun shipping a large blast engine, which they have recently completad, to Birmingham, Alabama. They have shipped as much as 75 carloads of their manufactures to that portion of the United States——The Etna Iron Works, this city, Messrs. Kimberly & Co. proprietors, contains 15 puddling furnaces. Between 450 and 500 men are employed. The nail factory attached to the establishment has 55 machines, and an average of 500 kegs of nails is the output daily. The Etna furnace No. 2, the property of this firm, is being torn down to be replaced by a larger one. The output of Aetna No. 2 has heretofore been 75 tons daily; the new one will turn out 100 tons each day.

Improved Mining Apparatus.

Some improvements have been lately introduced in the English mines, intended to prevent the great wear in the ropes by one coil chafing against the other, and obviating the necessity for coiling the ropes round the drums usually employed. In this new arrangement there is used a single winding rope, an upper set of grooved headgear pulleys and a lower set of grooved winding pulleys, each consisting of two pulleys and an intermediate grooved pulley between the two sets. The rope is attached to one end of the cages, passes over one of the headgear pulleys, under one of the winding pulleys —to which motive the power is applied—and back over the intermediate pulley, then under the other winding pulley, and thence over the other headgear to the other cage, to which the end of the rope is attached. By this simple plan not only is the greater durability of the rope necessarily insured, but all tendency to slipping off the rope is entirely obviated, because in proportion as the weight of the load is increased, the adhesion of the rope is augmented. Again, the bearings of the intermediate pulley may be carried in a movable frame, either inclined or otherwise, so as to admit of the pulley being adjusted as required, in order to maintain the rope taut.

The Antiquity of Cast-Iron.

A correspondent A. H., of Pocassett, Mass.,sends a clipping from an old newspaper on the subject of the first casting of iron. We quote in full as likely to be of interest to our readers without endorsing its historical accuracy:

Cast-iron was not in commercial use before the year of 1700, when Abraham Darby, an intelligent mechanic, who had brought some Dutch workmen to establish a brass foundry at Bristol, Eng., conceived the idea that iron might be substituted for brass. This his workmen did not succeed in effecting, being probably too much prejudiced in favor of the metal with which they were best acquainted. A Welsh shepherd-boy named John Thomas, had, some little time previous to this, been received by Abraham Darby into his workshop on the recommendation of a distant relative. While looking on during the experiments of the Dutch workmen, he said to Abraham Darby that he thought he saw where they had missed it. He begged to be allowed to try; so he and Abraham Darby remained alone in the workshop all night, struggling with the refractory metal and imperfect molds. The hours passed on and daylight appeared, but neither would leave his task; and just as morning dawned they succeeded in casting an iron pot complete. The boy entered into an agreement with Abraham Darby to serve him and keep the secret. He was enticed by the offer of double wages to leave his master, but he continued faithful; and from 1709 to 1828 the family of Thomas were confidential and much-valued agents to the descendants of Abraham Darby. For more than one hundred years after the night in which Thomas and his master succeeded in making an iron casting in a mould of fine sand, contained in frames with air-holes, the same process was practiced and kept secret at Colebrook Dale with plugged keyholes and barred doors.—*Blacksmith and Wheelwright.*

Subscribe for the TRADE REVIEW.

MECHANICAL RECEIPTS AND ITEMS.

Malleable Brass.

A German method for making malleable brass is as follows: Thirty-three parts of copper and twenty-five of zinc are alloyed, the copper being first put into the crucible, which is loosely covered. As soon as the copper is melted, zinc, purified by sulphur, is added. The alloy is then cast into molding sand in the shape of bars.

To Manage Saws.

It is not well to file all of the teeth of circular saws from the side of the saw, especially if each alternate tooth is bent for the set, but file one-half the teeth from each side of the saw, and of the teeth that are bent from you, so as to leave them on a slight bevel and the outer corner a little the longest. Never file any saw to too sharp or acute angles under the teeth, but on circular lines, as all saws are liable to crack from sharp corners. Keep your saw round so that each tooth will do its proportional part of the work, or if a reciprocating saw, keep the cutting points jointed on a straight line. The teeth of all saws wear narrowest at the extreme points; consequently, they must be kept spread so that they will be widest at the very points of the teeth, otherwise, saws will not work successfully. Teeth of all saws should be kept as near a uniform shape and distance apart as possible, in order to keep a circular saw in balance and in condition for business.

The Steam Pump.

Never use a smaller pipe on the suction than the list indicates. Avoid right angles in the pipe, where it is possible. Where it is practicable,make bends with a large radius. Put a foot valve and strainer on the end of the suction pipe. Do not place the pump more than twenty-nine feet from the water. Where hot water is pumped, the supply must be above the pump. Make all joints in the suction pipe tight. A sma'l leak in the suction is very detrimental. Keep the stuffing-boxes nicely packed. Oil the pump before starting it, and keep the oil wiped off where it is not needed. Some engineers seem to think that if their boilers are supplied with water there is no need of looking after the pump, or taking any care of it. A good pump is as worthy of being taken care of as a good engine, and we would suggest to all engineers and persons using or having charge of pumps, that they spend a few moments every day in cleaning them up, removing all extra oil on them, wiping off the dust and dirt, and seeing that they are in good condition and working well.

The Slide Valve.

The slide valve should be kept properly set and should be examined occasionally to see that the face and seat are in good condition. So long as this is the case, the valve mechanism and the valve itself must be let alone, and not tampered with. It is a part of the manufacturers business to set the valve and properly fit and adjust the valve connections before the engine leaves the shop; the eccentric should then be keyed to the shaft and not held by a set screw, as the latter is likely to work loose and make lots of trouble. If the eccentric is keyed to the shaft the only adjustment necessary in the valve connection is to take up the wear of the joints; this is easily done and will not require doing oftener than once or twice a year, depending on the care the engine receives. Should the eccentric be fastened by means of a set screw instead of a key, and it should work loose after running for some time, it may easily be brought back to the original position by taking off the steam chest cover and after placing the engine on a dead center- move the eccentric around the shaft until the valve is just about to open the port; care being taken that the center line of the eccentric "leads" the crank-pin in the direction in which the engine is to run if the connections are so made, if not, then the eccentric must be moved around on the opposite side of the shaft.

Drilling or Turning Glass.

A splinter of diamond may be readily fastened in the end of a piece of stout brass wire so that it may be used for drilling or turning glass. Bore a hole the size of the splinter and so deep that the diamond may be inserted beyond its largest part, but leaving the point projecting. Then, by means of a pair of stout pliers, it is easy to press the end of the brass so that it will fill in around the diamond and hold it tight. Diamonds are sometimes cemented in such holes by means of shellac, or even solder run around them. This answers for some purposes, but not for drilling or turning.

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COST PRICE OF STEEL.

The cost price of steel is a question in which consumers of the article have just now a special interest, in view of the competition among steel men themselves. The asservation of the Western rail producers that steel rails cannot be made at $40 a ton to yield a profit, contrasts strangely with the fact that Eastern rolling mills are running prosperously at that figure. If so, the question arises whether there are not points of economy in Western production, other than the lowering of wages, which our producers might advantageously study. Mr. Scranton, of the new Scranton Steel Mill, Scranton, Pa., now being erected and equipped with one of the most perfect plants in the world, affirms that high prices and large profits have rendered steel men somewhat indifferent to the adoption of the best devices for saving labor and fuel and generally facilitating operations. It is not to be expected, indeed, that they shall change a greater portion of their plant, or introduce such sweeping improvements as those which will characterize the new Scranton mill, but the possibilities which offer in the way of thrifty devices should modify their assertions as to what steel rails can be profitably offered at. Any way, consumers have never got at the actual cost of making steel. This is a combination secret. Authorities are abundant to the effect that the best grades of steel can be produced with about one-fourth the fuel required for iron. Mr. Scranton says of the company of which he is President: "We will roll our rails direct from the ingot, instead of doing as the old works, which beat the ingots into blooms, cut them at the hammer, then reheat the blooms and roll the rails. All this we will be enabled to do at a single heat, saving one heating and all the work at the hammer and one rolling. In addition to making the rail at a single heat we will roll a four length rail 150 feet long, afterward cutting it into the proper lengths, and saving 10 per cent in 'crops' alone."

Their mill, which sets out to produce rails at $40 per ton, will, in addition to a complete equipment, have fuel termed coal culm, or anthracite waste, delivered at 16c per ton. which will constitute four-fifths of that consumed. This culm exists in inexhaustible quantities in the valley, affording special competing advantages, and the opinion we form is that the Scranton Mill Co. will be enabled to turn out steel rails at a profit at a far lower figure that $40 per ton. The competition that is being inaugurated among steel men themselves is, we confess, a pleasing feature of the situation. With a capacity of production increasing in a higher ratio than requirements, and with the check imparted to the undue extension of railways, it is evident that a period of lower prices in steel must be met.

PRESENT AND PROPOSED TARIFFS.

The *Engineering and Mining Journal* has, at the expense of much pains, collocated the present and the proposed rates on iron and steel and their products, and as its table presents by far the clearest idea we have yet seen regarding the changes recommended, we give it herewith:

	Present.	Proposed.
Iron ore	20 per cent.	50c. per ton.
Iron pyrites	20 per cent.	50plus 2½c.for copper.
Oxide manganese	20 per cent.	50c. per ton.
Pig-iron	$7 per ton.	3-10c. p. lb.
Cast scrap	$6 per ton.	3-10c. p. lb.
Wrought scrap or scrap steel	$8 per ton.	3-10c. p. lb.
Bar iron, according to dimensions	1@1.5c. p. lb.	0·9@1·2c. p. lb.
Iron railroad bars	0·7c. p. lb.	0·7c p. lb.
Cut nails and spikes	1·5c. p. lb.	1·25c. p. lb.
Wire nails	35 per cent.	4c. p. lb.
Horseshoe nails	5c. p. lb.	4c. p. lb.
Iron and steel forgings	2c. p. lb.	2½c. p. lb.
Anvils and cable chains	2½c. p. lb.	2c. p. lb.
Boiler tubes	3½c. p. lb.	3c. p. lb.
Other wrought iron or steel tubes	3½c. p. lb.	2½c. p. lb.
Boiler and sheet iron according to gauge	1¼@1½c. p. lb.	1·3@1·7c. p. lb.
Tin plates	Free.	2·2c. p lb.
Hoop, band, and scroll	1¼@1½c. p. lb.	1·2@1·6c. p. lb.
Steel ingots, blooms	45 per cent., and on smaller sizes valued at 7c., or less, 2½c.; above 7, 3c.; above 11, 3½c. p. lb.	Valued at 5c., or less, 2c. p. lb.; above 5, 2¾c.; above 9, 3c. p. lb.
Steel railroad bars	1¼c. p. lb.	0·8c. p. lb.
Iron wire	¼in. dia. to No. 16, 2c. plus 15 p. c; No. 16 to No. 25, 3·5c. plus 15 p. c.; above No. 25, 4c. plus 15 p. c. p. lb.	To No. 10, 2½c.; No. 10 to No. 18, 2¾c.; No. 18 to No. 26, 3¼c.; above, 4c. p. lb.
Steel wire	¼in. dia. to No. 16, 2½c. plus 20 p. c.; finer, 3c. plus 20p.c.	Same as iron wire.
Wire cloth	Not provided for.	Same as wire of same gauge plus 3c. p. lb.

Attention will naturally be directed first of all to steel rails, since the heaviest reduction is placed upon them. The present tariff on these is $28; the proposed tariff is $17.92. The *Journal* calls attention to the compound dutv on pyrites as being objectionable, since it asks smelters to pay 2½ cents per pound of copper in the ore, when at least one large works in this country smelts so that the oxide of iron is abandoned. Undoubtedly defects will be pointed out in the report as it is studied by experts, and the Commission has done well to spread the results of its work before the country in time for the most ample consideration.

THE Civil Engineers' Club, of Cleveland, Tuesday evening listened to a very interesting paper by Mr. J. A. Sargent, the veteran engineer, on "River Pollution and the Drainage of the Bottom Lands of Cleveland." Mr. Sargent proposed as an outfall for the present inadequate sewer system a horizontal tunnel 24 feet below the surface of the Cuyahoga River, the sewer to be operated by head produced by lifting works located a short distance out in the lake, with a discharge beneath the sur face so as to obviate the shoreward wave action and get the benefit of the "undertow." For intercepting sewers he would provide wells so constructed as to take care of the sewage and at the same time throw the storm water into a dock on the river prepared to receive it. Interesting details as to the proposed route, the estimated cost and the manner of converting Walworth Run into an open sewer by narrowing and straightening the channel into a V shaped conduit were given, and the succeeding discussion brought out many valuable points. The Club, now under the Presidency of Mr. J. F. Holloway, is composed of the representative engineers, scientists, and iron and steel men of the city, and is accomplishing much good in the discussion of topics of practical interest to these several callings. Its meetings are held monthly in the Club rooms, in the rear of Case Library.

THE stove trade of Cleveland is experiencing what may justly be termed the good effects of competition. With the largely increasing use of the gasoline stove the coal stove was closely pressed in the race for popular favor, and manufacturers had to go after their trade if they would retain and enlarge it. But with this disadvantage came a compensation in the way of a growing demand for stoves of better grade, so that the old and cheap patterns are being pushed aside, let us hope, for ever, and in their place are being sold the very best products of the molder's art. Significant confirmation of this fact is the statement to the REVIEW by a leading Cleveland company, that whereas the average price, wholesale, formerly received per stove was $15, now the average is about $30. This, of course, encourages better work, gives employment to more skilled workmen, and shows a growing public sentiment in favor of buying the best, because, in the long run, it is the cheapest.

To the courtesy of Col. Sidney D. Maxwell, the veteran Superintendent of the Cincinnati Chamber of Commerce, the REVIEW is indebted for advance sheets of portions of his forthcoming annual report. The dry goods and clothing business of Cincinnati, it is to be regretted, has not been as satisfactory as expected, though the figures here collated are by no means such as to be ashamed of:

	1881-2.	1880-1.	1879-80.
Dry Goods*	$25,327,234	$24,203,101	$23,637,531
Clothing	17,099,434	17,605,133	15,334,030

*Including houses that do both a wholesale and retail business.

The causes of the comparative dullness in trade were the drought of 1881 and the warm winter following. The Cincinnati Southern has not brought the trade to Cincinnati which business men were led to expect, and already there is a cry against excessive freight rates from many parts of the South. Having built the road, however, Cincinnatians should now address themselves to the task of making it bring them a just return for their liberal investment.

THE *Age of Steel*, St. Louis, says the REVIEW need have no fears that the rubber manufacturers will shut down their works in view of the Para rubber corner. The REVIEW simply commented on the action of the first meeting of the manufacturers and in a subsequent issue gave the result of the second meeting, when a reduction of 50 per cent. was agreed on; so that the "fear" of a total suspension does not reside within the precincts of this office. We apprehend, however, that the *Age of Steel* was concerned more in making a point against an Ohio firm that has been trying to pass off some worthless goods upon an unsophisticated tobacco manufacturer "in a neighboring city." The REVIEW agrees that such firms will not be affected by any corner in Para rubber, since pure Para seems to be no part of the material used in their products; but it fails to see wherein the instance cited applies to the case in hand without being altogether too sweeping upon the trade.

A FEATURE of the late "blizzard" on this continent and abroad was the snowing up of a passenger train at Cheshire, England, during which, a cable dispatch says, "the passengers suffered acutely." A proper appreciation of this fact is best obtained when it is stated that the only means of heating passenger cars, or "carriages," as they are called in England, is by means of small copper foot-rests filled with hot (?) water, which are changed at intervals along the route. A hot-air or even a stove-heated American car affords no such perils—so long as the coal and seat-frames hold out.

ONE of the most commendable features of the Tariff Commission's report is the recommendation in favor of a Customs Court. The unusual power now given the Secretary of the Treasury, the long and vexatious delays and great expense in reach-

ing the Supreme Court, and the fact that, after all, the cost comes in good part out of the consumers, are a few of many strong points in favor of the proposed new court. The plan is to have it made up in part of customs experts, and to be located at New York, holding sessions also once a year in San Francisco and New Orleans. In order to simplify proceedings and hasten decisions, no pleadings will be necessary in ordinary cases. Such a court would soon relieve existing courts of their glut of litigation and would forever after provide a sure and speedy means of settling disputed points.

THE Tariff Commission argues with great plausibility that exceptionally high duties in particular cases cast discredit upon our whole economic system and put arguments in the mouths of the opponents of protection for its complete subversion. The absence of any war necessity, the improvements in machinery and processes, and the high scale of productiveness are presented as reasons for a reduction in duties—this reduction, as proposed by the Commission, being represented in general terms by about 25 per cent. No attempt is made to show the aggregate reduction in the whole of the revenue, but it is thought that this will be something less than 20 per cent., counting on a temporary increase in importations consequent upon a lower tariff.

As the season advances, the probabilities of any important movement of breadstuffs and produce grow less and less. Our Western farmers seem more determined than ever to commit the folly of lapping this year's crop on to that of 1883. Freights from the West and Northwest of Chicago to that city are little more than nominal, and although the question of restoring rates has been publicly agitated, shipments have not been stimulated. The British market is firmer, but the export demand for Europe is next to nothing This fact reacts on the trade of the country. We are heaping up indebtedness, and this, with a further depression of the coal and iron trade, and the closing up of mills which are iron and coal consumers.

AUTHENTIC figures are given, in an article printed elsewhere, regarding the iron ore business of Cleve land during the past season, together with some indications as to the outlook for next season. Inquiries have been made among those best prepared to speak, and the statements set forth can be relied on in all particulars. Cleveland is the center of distribution for a large section, and to the REVIEW outside parties interested in iron and its products will find it desirable to look for the latest information touching this important branch of industry.

PATENTS cost less in the United States than in any other country. In looking up the subject for his annual report, Secretary Teller found that in England it costs $1,800 to obtain a 14-year patent, in Germany $600, in Russia about $400, and in Canada $1,400, while here it costs but $35 for a 17-year patent. The results of this liberal policy have been found in the rich harvest of inventions which have placed us far in advance of the countries of the Old World, and laid the foundations for our most extensive industries.

THE REVIEW is indebted to Joseph Nimmo, Jr., Chief of the Bureau of Statistics of the Treasury Department, for his report of the foreign commerce of the United States for October, 1882. The leading figures of this report appear elsewhere.

ACCORDING to Secretary of State Townsend's forthcoming annual report, there were filed during the past fiscal year 909 articles of incorporation, with a total capital stock of $252,436,350; 84 companies have increased their capital stock $72,421,150, and five companies have decreased their capital stock $970,000.

LAST week's *Iron World*, Pittsburgh, has a full description of Mr. Jacob Reese's "basic process," details of which, from Mr. Reese himself, were given the week before by a REVIEW correspondent.

SPACE for the January special edition of the REVIEW is rapidly filling up. Advertisers will do well to send in their favors early.

THE *Herald* is making war upon food adulterations in this city. Its point that a Fruit Inspector is needed is well taken.

THE Free Traders are the first to attack the Tariff Commission's report. That is one point in its favor.

CLEVELAND'S IRON ORE TRADE.

SUMMING UP THE BUSINESS OF 1882—THE OUTLOOK FOR 1883.

Seven Hundred and Fifty Thousand Tons Placed on Cleveland Docks the Past Year.

The shipments of Lake Superior ore to Cleveland as the leading emporium and distributing point, have proved an important factor in the ever-growing prosperity of this thriving city. This ore goes not only to the blast furnaces of Ohio, to be blended with our native ores, but to Pennsylvania, Illinois and Virginia. Here we may state that the West produces and consumes more than half of the pig iron product of the United States, drawing in addition to its own iron products on Eastern, and, to some extent, on foreign ore. Shipments of ore to this port date from 1853, when the St. Mary's Fall Ship Canal was so far completed as to afford an outlet for the Upper Peniusula ores. The product of Superior iron ore which in 1881 was 2,361,311 tons, has this year been in round numbers 2,800,000 tons, of which there have been placed on the Cleveland docks 750,000 tons. The balance has been shipped to Toledo, Sandusky, Erie, Lorain and Fairport. Of this amount the Marquette district furnished one-third, the Menominee range coming next in amount. The output both of these and other sections has been larger this year than ever before. As is well known, the superiority of the Republic ore enables it to command a price much higher than any other, the prices of which are fixed relatively to it. In the early part of the present year the Republic Iron Company put its own ore at $10 on the docks at Cleveland. There was much protest at the time at what was considered by the furnace men too high a figure, but the improving condition of the iron trade enabled it to be maintained. We append the following statistics:

TABLE

EXHIBITING IRON ORE PRODUCTION OF LAKE SUPERIOR ORE REGION FROM 1871 TO 1882, INCLUSIVE, IN GROSS TONS, AND PRICES OF REPUBLIC IRON ORE ON DOCKS AT CLEVELAND.

	Production.	Price		Production.	Price.
1871	813,684		1877	1,025,129	$ 7.00
1872	948,553		1878	1,125,093	7.00
1873	1,195,234	$12.50	1879	1,214,182	10.00
1874	935,488	8.75	1880	1,987,598	10.00
1875	910,840	7.50	1881	2,361,311	10.00
1876	993,311	7.00	1882	2,814,301	10.00

Prices will not be set until the end of February or commencement of March, of next year. The determination of the price at which ore is to be put, involves the question of the prospective development or otherwise of the iron trade, but the prevailing impression even among ore men is that, in view of the causes which occasioned the present depression, and the almost absolute certainty of a somewhat reduced business in 1883, as compared with 1882, Lake Superior ore must be marked lower. We append an exhibit of shipments.

TABLE

EXHIBITING IN GROSS TONS LAKE SHIPMENTS OF IRON ORE FROM UPPER PENINSULA PORTS UP TO AND INCLUDING NOVEMBER 20, WITH THE AMOUNT SHIPPED DURING THE CORRESPONDING PERIOD OF LAST YEAR.

Name of Port.	1881	1882
Escanaba	1,414,945	1,735,250
Marquette	696,780	950,832
L' Anse	53,160	70,543
St. Ignace	.....	57,667
Grand Total	2,164,885	2,814,301

The average rate of freight throughovt the navigation season from Escanaba to Cleveland and other Erie ports has been $1.20, and from Marquette $1.60.

An English Fourteen-Story House.

During a recent stay in London, says the editor of *La Nature*, we had an opportunity of observing a curious structure. The building is an apartment house, which, counting the floors beneath the level of the street, and the attics, numbered fourteen stories. Besides these there are two sub-cellars. This house is located in a new quarter near the Westminster Abbey. On approaching it the beholder is filled with astonishment at the aspect of a so truly monumental mass, whose total height is about one hundred and thirty feet. The number of windows in the structure, inclusive of those looking out upon the vast courts within, exceeds five hundred. The tenants of the house and its visitors reach its different stories by means of a hydraulic elevator, which takes about two minutes to reach the thirteenth story. After reaching the latter a marvelous panorama may be observed if the weather is clear. But, as well known, fogs are frequent in London, and it often happens that the tenants of the upper floors are immersed in clouds, after the manner of aeronauts.

There is at Genoa an eleven-story house, and there have been in former times some constructed at Paris of seven and nine stories; and, in the United States, numerous experiments have been made with similar structures, these becoming practicable with the use of elevators.

The city of London has long had the reputation of having houses only of from two to three stories; but the example here brought to notice shows what can be done by English architects, who, it appears, are not restrained, as they would be at Paris, by administrative regulations.

New Signalling Lamp.

An ingenious adaptation of the electric signalling system has been effected in connection with a lamp which is made to give notice of either a burglarous entrance into or a fire upon premises where it is employed. The apparatus consists of a small battery with wire leading to attachments on dors and windows, and other wires communicating with the lamp, which may be placed either inside or outside the premises, as preferred. Upon a door or window being moved, after the apparatus has been set for the night and the lamp lighted, a red glass disc is released by the aid of a small electro-magnet placed within the lamp, and a red or danger signal is thus given, the light having previously been white. For fire purposes a special thermometer is used, and when the raised temperature causes the mercury to rise, metallic contact is made, and the lamp at once shows the danger signal. Placed outside houses or public buildings, this lamp would afford a sure index to the police as to the safety or otherwise of the interior of the premises.

Municipal Mistakes in Sanitation.

In an address on "The Relation of the State to the Health of the People," delivered before the Ohio State Medical Society, Prof. Edward Orton, of the Ohio State University says: "I have heard of a trunk sewer in a principal street in a great city, that, like a gorged serpent, is larger in the middle than at either end. I have heard of long lines of underground work that have been left unused and that have been forgotten. I have known of many sewers, several times too large for any possible demand upon them, along whose rough and obstructed walls the small streams of sewage meandered slowly, with ample time for destructive decomposition before they reach their outfall. I found two towns of our striving commonwealth, in the year of our Lord 1881, building sewers and connecting privy vaults with them before a water supply was secured or even definitely thought of."

The Influx of Foreign Capital.

AT no time in the history of this country was there ever such an influx of foreign capital as there is to-day. Representatives of foreign capitalists are swarming over the Southern States and Western Territories, purchasing almost everything in sight. In the South pine lands, mines, and mill and factory sites are most eagerly bought, and in the West stock, ranches, and mining properties. Each day brings news of purchases made by Scotch or English syndicates in the West and South, the sales aggregating millions of dollars.—*Age of Steel.*

THERE is likely to be a stir in the engine trade next year, as large manufacturers announce their intention of selling regardless of price.

PRACTICAL MECHANICS.

DECORATING TIN PLATES.

An ordinary tin plate is prepared for decoration by coating it with a chemical composition generally of a white color, but into which no lead is introduced. This composition is allowed to dry and harden. It appears, if the term may be allowed, to soak into the metal, so infinistessimally thin is the coating which it gives. A matrix of paper, upon which is the pattern to be conveyed to the tin, is then taken. The colors of the pattern on this matrix are also of special preparation, being without lead and capable of resisting the action of the strongest acids. Water is applied to the matrix, in a quantity large enough to damp it thoroughly, and it is then laid pattern downwards upon the prepared surface of the plate, which with the matrix upon it is subjected to pressure—that of an ordinary copying-press being sufficient. After a moment's pressure plate and matrix are withdrawn, and the paper of what was the matrix is pulled gently from the tin, leaving its colored pattern clearly visible upon the surface. Yet another minute or two and the colors are dry upon the tin, having as it were penetrated into it, and become part of it, so effectual are the ingredients in the colors of the matrix when they come in contact with the prepared surface of the plate. The whole process is a marvel of science, and especially chemical science, applied to an industrial and useful purpose. The plate is now ready to be made into any box, canister, show-plate, or label, to which the pattern it bears may be applicable. The plates may be stamped by dies in machinery, bent at acute angles, twisted, subjected to pressure, and cut in the process of being made into any article, without the colors of the pattern fading or breaking or peeling off or becoming in any way affected. They may even be soaked in muriatic or nitric acid; but even then only the iron of which the plate is made will be injured. This will, "like the unsubstantial fabric of a vision," vanish into invisible fluid and gas; but the colors of the pattern and the pattern itself will remain, floating in perfect cohesion upon the acids which entirely destroy a metal plate. We saw a tinplate about six inches square decorated with a pattern by this new process placed in these acids, with the result above described. The test was a crucial one, but the experiment ended with the triumph of the pattern, the colors of which remained unaffected, while the plate gradually dissolved. No proof more decisive as to the tenacity of the colors, and of the knowledge with which their constituent parts have been selected by the inventor, than this could be well desired. A perfect acquaintance with the chemical science bearing upon the subject lies evidently at the basis of the new process.

If we examine the artistic qualities of the tins thus decorated, we find almost as great an advance in this respect as in the qualities of durability, strength and cheapness. Much, perhaps, is due to the artist to whom the designs for the tinplates decorated by the new process are entrusted. They are always tastefully-selected colors, and the patterns are finely conceived and well expressed in the drawing, the various parts being in fine proportion and the borders especially well treated. But all this art would be lost were the process of transfer to blur or change the colors, or result in a badly-defined outline. The lines of demarcation between red and blue or white and brown are, however, by this process preserved, and reproduced on metal with as much precision and clearness as the black and white on a playing-card. They do not run, nor are they dimmed. The colors of the artist's design are simply reproduced in their pristine freshness. The artistic effects of marbling, and of mother-of-pearl, of bronze, silver, and gold are produced in a remarkably ingenious way when the plate is being prepared for the reception of the pattern proper. In some instances electricity is applied to do this, the plate being placed in a fluid composition the while. The effect is most unique and altogether unattainable by any other system we have heard of. In other patterns, again, there was an imitation of *cloisonnee* of extreme beauty. The plates may be exposed to sun, to rain, and to all atmospheric influences without deteriorating in any way, a quality which increases their market value.

THAT leading iron and steel authority, the Philadelphia *Bulletin* (James M. Swank, editor), kindly says: "The REVIEW has long been recognized as a most efficient organ of the manufacturing interests of Northern Ohio, and we have no doubt that its new proprietors will extend its usefulness and expand its field of operations. We have observed many improvements in the paper in the short time since it has changed hands, and it is assuming a much more attractive appearance than of yore."

To Make a Mahogany Wood Stain.

1. Water, 1 gallon; madder, 8 oz.; fustic, 4 oz. Boil. Lay on with a brush while hot, and while wet streak it with black to vary the grain. This imitates Honduras mahogany.

Time Furnished by Wire.

A company has just been incorporated at Albany, New York for the manufacture, use, lease and sale of instruments for the indication of time by telegraph. The idea upon which the company is based is a good one. Whether this organization has the capital and the practical men to make the enterprise a success we do not know. There is no doubt that in the principal business establishments of large cities, where correct time is a necessity, the clock will soon be a thing of the past. A synchronized dial-plate, connected by electric wire with a central time-piece will take its place. It is quite as feasible as furnishing electricity or gas or steam from a central manufactory. The Manhattan Elevated railroad company is now completing arrangements to place synchronized dial-plates in its stations, all connected with some standard time-piece which will very likely be the clock in the Western Union building, New York. This new company purposes to place central clocks in different parts of the city, which will be carefully regulated and frequently compared with some standard time-piece. Synchronized dial-plates connected with these clocks will be furnished to whoever desires them at a regular tariff.

INDUSTRIAL SCIENCE.

WHY DOES STEEL HARDEN?

The inquiry has been pursued diligently by Prof. John W. Langley for the past five years, and has been directed exclusively to the gathering of facts, so that as yet we have not even a theory to offer. The inquiry may be divided as follows: 1, The physical structure of steel; 2, The chemical composition; 3, The variations of structure and physical properties due to—*a*.—Cooling from fusion; *b*.—Effect of work, either by rolling or hammering; *c*.—Effect of temperature, and of changes from one temperature to another, as shown by slow cooling or rapid cooling. 4, A statement of the various theories of hardening; 5, Some practical conclusions of workers of steel.

1. The physical structure of steel. In this paper it is to be understood that reference is made only to cast steel. Steel is crystalline in structure. The size, color and form of the crystals, when steel is allowed to cool without hindrance, from a state of fusion, are governed by its chemical constitution, and are mainly influenced by the quantity of carbon present.

2. The chemical composition of steel. Steel is mainly an alloy, compound or mixture of iron and carbon. Exactly which of these it may be, or whether it is a combination of two or of all three of these conditions, it is difficult to say. Other elements, as silicon, phosphorus, sulphur, manganese, and so on, are as yet present only by sufferance, and generally it is well known that steel is better without any of them. The range of carbon in commercial steel may be said to be from about .05 per cent. to 1.75 or 2 per cent., but for some purposes of this inquiry we may look at several properties of cast iron as being useful to throw light on the subject.

3. The variations of structure and physical properties do to— *a*.—Cooling from fusion—as affected by chemical composition, temperature, and rate of cooling. As the observation of these phenomena furnishes material for the study of a lifetime, and as they cannot be described properly without the objects themselves, only a few well known facts will be mentioned, for use in the latter part of this paper. Cast iron, when poured into iron molds, hardens just as steel does when quenched in water; this is known as "chilling." A chill is of silvery white color, bright luster, and consists of elongated crystals generally normal lengthwise to the surface of the mould. If iron contains little or no silicon, it will chill very deep, or entirely through the mass in small castings. If much silicon be present it will not chill at all. If a hard chill,—for instant in a hammer die,—say two inches thick of chill, be brought to a red heat, removed from the fire at once and allowed to cool slowly, it will, when broken, be found to be softened, but it will retain the marked crystalline form of the chill. This is analogous to tempered steel. If the same chill be heated red, and kept red-hot for several hours, and then cooled slowly, it will be found upon breaking to be an entirely amorphous gray cast iron; every trace of the elongated crystals of the chill will have disappeared. This is analogous to annealed steel. This experiment is a striking example of iron and combined carbon in the one case, and of iron and graphite carbon in the other case, as these conditions are commonly understood. This observation is useful in understanding similar changes which occur in steel under the similar conditions of hardened, tempered and annealed steel. Steel when cast is almost invariably poured into iron moulds, and the study of fractured ingots is very necessary to the steel-maker; but as the ingots very rarely go into the hands of the consumer without previous manipulation, it is hardly necessary to consume time in discussing the characters of the fractures, especially as it requires the actual presence of the ingots to make the description at all intelligent. It is sufficient to say that we have here an unvarying record of the completeness or incompleteness of the fusion, of the rate and temperature of the pouring, and of the chemical character of the steel, especially as it relates to carbon. *b*.—Effect of work, either by hammering or rolling. Steel, when heated and hammered or rolled from the ingot, has its specific gravity largely increased, its strength is greatly increased, and its grain is very fine and uniform; this is called "hammer refining," to distinguish it from the refining due to hardening. An eminent Russian engineer has illustrated this hammer refining beautifully by comparing the hot steel to a certain solution of a salt. If the solution be allowed to precipitate slowly and undisturbed, very large crystals will be formed, but if it be violently shaken, the crystallization is hastened and very fine crystals are formed. So if steel be heated quite hot, but not so as to burn it, and be allowed to cool very slowly, it will form in very large, bright crystals and be very friable; but if as soon as it is hot it be taken to a heavy hammer and be thoroughly hammered by rapid and powerful blows at first, and then by lighter blows until it is of the required shape, it will be found to be very fine in grain and very strong. Therefore, a high softening heat is consistent with good work in forging. *c*.—Effects of temperature, and of changes from one temperature to another, as shown by slow cooling or rapid cooling. The effect of heating steel which has been hammered or rolled is to increase the size of the crystals or grain, in proportion to the temperature, and to reduce the specific gravity. There is an apparent or real exception to this increase in size of grain in steel which has been hardened from the proper temperature to produce what is known as "refining." In this case the grain is much finer than in the bar, and in this condition any piece of hardened and tempered steel is at its best. As this refining temperature varies with every different quantity of carbon, no rule can be laid down for determining it; it must be found by actual trial. But there is no exception to the matter of specific gravity. The specific gravity of refined steel is less than that of the bar, although the grain is much finer. If steel be heated and cooled slowly it will be softened; that is, annealed. If it be heated very hot, say to bright yellow, or kept hot a long time, and then cooled slowly, it will still be annealed, but it will be harsh and gritty, will not cut well, and will neither refine well when hardened nor hold a good edge when tempered. The cause of this will be obvious if we remember the experiment of the annealed chill mentioned in the earlier part of this paper. If steel be heated to different degrees, as red, bright red, orange, lemon or bright yellow color, and quenched, it will be found to be harder, more brittle, and coarser in the grain for each increasing degree of heat, after the refining heat has been passed. Below the "refining" heat there will be no useful degree of hardening, and the grain will be variable. If any piece of hardened steel be heated red-hot, and cooled slowly, it will be softened, the grain of the steel will return to its original appearance in the bar, and its specific gravity will be restored to the specific gravity of the bar. This fact should put a quietus upon all quack nostrums for "restoring burnt steel."—*Treatment of Steel.*

RAILROADS AND TELEGRAPHS.

THE official total earnings of the C., A. & C. Railroad for October, were $54,708.15; operating expenses, $36,160,55; net earnings, $18,547.60.

FIVE new baggage car and six coaches for the new Chicago & Atlantic have arrived at Marion, and a mixed train will soon be put on between that place and Lima.

WORK on the Cleveland, Youngstown & Pittsburgh is progressing rapidly through Jefferson county. At Nebo, 18 miles from Steubenville, 70 Italians are at work.

GEO. D. WALKER, Receiver of the C., Mt. V. & D. Railroad, has asked Judge Tibbals, of Akron, for leave to issue $50,000 Receiver's certificates for new purchases, making $400,000 in all thus far.

UNDER a decree of foreclosure in favor of the Union Trust Co., of New York, the Cleveland, Tuscarawas Valley & Wheeling will probably be sold next month in this city. The road will no doubt be bid in by the bondholders.

THE Connotton Valley Railway has reached Beach City and the rails are laid to Rowville. The REVIEW learns that the order of stations on the New Straitsville branch has been fixed as follows: Navarre, Justice, Beach City, Dundee, Barr's Mills, Shanesville, Rowville, Avondale, Coshocton.

THE trustees of the N. Y., P. & O. Railway announce a dividend of $12.50 in cash, payable next January, upon its first mortgage bonds. In consequence, those bonds are now in brisk demand in the London market. This looks as if the other bonds were to be thrown overboard.

THE Columbus, Hocking Valley & Toledo Railroad has just added two miles to Snow Fork branch, completing it to Murray City. Murray City is named in honor of Murray Brown, of Cleveland, O., who sold the Murray City Coal Company a tract of land underlaid with coal. The company is composed of Messrs. Gosline & Barber, of Toledo.

Kent *News:* The freight traffic of the N. Y., P. & O. Railroad Company has steadily increased until it is almost beyond the capacity of the road to dispose of it. The Kent yard a good part of the time is almost impassable, and trains are frequently delayed on account of it, and even along the line the trains are so heavy the side tracks will not hold them, and passenger trains are delayed by it.

UPON a test case brought by the Baltimore & Ohio, Judge Baxter, in U. S. Circuit Court at Columbus, December 7, decided that the State Board of Equalization has the power to increase the valuation placed upon railroad property by county auditors. The B. & O. sought to restrain the collection of an increase of about $200,000 placed upon the Lake Erie division in 1880 by the State Board.

IT now looks as though the Columbus & Cincinnati Midland Railroad would be put through on short notice. The line as projected will run from Columbus to New Vienna, in Clinton county, which is on the Marietta & Cincinnati Railroad and about 50 miles west of Chillicothe. It will pass through the counties of Franklin, Madison, Fayette, Highland and Clinton. The road will run in a southwesterly direction from Columbus, passing through Harrisburg, Grove City, Mt. Sterling, Washington C. H., and thence to the terminus, New Vienna.

THE world's railways at the close of last year had attained a total length of 249,500 miles, all but 4,990 miles of which were constructed since 1840, or the life of a generation. In this period Asia, Africa, and Australia have been supplied with railways. The United States leads all other countries with its 104,831 miles of completed road; Germany ranks next to us, with 21,446 miles; Great Britain comes next, 18,281 miles; France next with 17,112 mile; Russia has 14,779 miles. The United States has more miles of railway than all Europe.

THE Mt. Vernon *Banner* announces a proposed new combination looking to a trunk line extending from New York and Philadelphia to the Mississippi River, via the Delaware, Lackawana & Western, Cleveland, Akron & Columbus, and the Indianapolis, Bloomington & Western railroads. The entire line, except a break from Brocton, N. Y., to Hudson, O., a distance of about 120 miles, is already finished and doing a handsome local business, and only needs the completion of the gap to place the road at once in the front ranks of trunk lines.

VANDERBILT nips in the bud a nice little story about himself, James McHenry and Franklin B. Gowan completing a road from Williamsport, Pa., to Salamanca, N. Y., to get a Western outlet for the Reading and divert the business of the N. Y., P. & O. from New York to Philadelphia, by saying that he is simply building a coal road to offset the Lackawanna's road to Buffalo; that he is not reaching out for the N. Y., P. & O., and that to say that he is working in the interest of Philadelphia as against New York is absurd.

AT their coming meeting the Valley Railway stockholders will vote upon building a switch from Peninsula to Boston Ledges. From Mr. F. B. Wadhams, owner of the Ledges, the REVIEW learns that if the switch is ordered built it is the purpose to lease some 35 or 40 acres to the railroad company for quarrying purposes. The remainder will be fixed up into a summer resort. Boston Ledges are situated exactly 2¼ miles from three roads—the Valley, the Cleveland & Pittsburgh and the Cleveland, Akron & Columbus.

THE Ohio Central Railway Company, the route of which is from Toledo through Bucyrus, Fostoria, with a branch running into Columbus, and on down into the Sunday Creek coal field through Corning, on to the Ohio River at Mt. Pleasant, where an iron bridge is under construction, is now finished on this side the Ohio River as far as Athens. From the river to Charleston, W. Va., another link has already been completed. It is proposed to push it on through West Virginia, up the New River, through the fine coking coal field, to connect with the Richmond & Allegheny, giving them an outlet to the seaboard.

NEW TELEGRAPH PROJECTS.

IT is reported to the REVIEW that employes of the Postal Telegraph Co. are now working east from Mantua, Portage county, on their main line between New York and the West.

THE American Rapid Transit Co. are rapidly pushing their telegraph line toward Cleveland. The REVIEW is informed that the company has bought the right of way along the Connotton Railway and that it will run five wires (including one for the railroad company) the entire length of the line to Coshocton. Poles have already been delivered from Streetsboro Corners to Cleveland, and wires were stretched to within two miles of Twinsburg, Summit county, last Saturday, under the direction of Superintendent Vane. The "American Rapid," it is well known, proposes to transmit 20 words for 25 cents.

SCIENCE AND INVENTION.

NEW INCANDESCENT LAMP.—Mr. Werdermann, whose electric discoveries have attracted much notice, has just patented a new incandescent lamp. The peculiarity of this lamp consists in the fact that the vacuum, indispensable in other such lamps, is dispensed with. Mr. Werdermann employs silicium in place of carbon, and he has succeeded in procuring from it better results than if carbon were employed.

A NEW CEMENT.—The cracks in common mortars and cements are due, according to M. Decourneau, to the uncombined quick-lime which they contain. In order to neutralize the lime and overcome the difficulty, he employs a compound formed by mixing very fine silicious powder with diluted nitric acid. By this means, mortar is obtained having a much greater as well as more uniform and lasting resistance than those hitherto in use. The application of this method it is stated, has given excellent results, especially in the new forts at Paris, and the stones made by such process may be sawed and chiseled like natural stone.

ELECTRICITY AND AGRICULTURE.—France seems to be taking the lead in applying electricity to agriculture, although Germany is not wholly idle in adapting the new motive power to the wants of the farmer. Thus at an agricultural gathering recently held at Ludenburg, some interesting experiments were made in the use of electricity instead of steam for the threshing of wheat. Messrs. Piette and Krizik lit up electrically the space reserved for machines, and at the same time utilized the current to drive an ordinary threshing machine. The cylinder of this machine attained a speed of 1,400 turns a minute. It will probably be a long time before electricity is generally applied to ploughing lang or driving threshing machines, but there can be no reason why farm houses and buildings should not be lit up by electricity, particularly in the New England States, where water-power for driving a dynamo is running to waste on the majority of homesteads.

A QUEER PATENT.—The London *Building and Engineering Times* thus notices an odd Yankee invention: Patents are taken out for the most extraordinary, not to say amusing, inventions; but we think about the most extraordinary, if not amusing, application for letters patent that we have ever met with is to be found in the Commissioners of Patents' Journal, dated October 27th. It is as follows: "5,099 Roald Arentz, of New Britain, in the county of Hertford, and State of Connecticut, United States of America, for an invention of 'Cosmie,' being the name for gathering energy of that force which in its normal existence eventuates gravitation." We must confess that we do not know what Mr. Roald Arentz means. Perhaps he does not intend we should, in case we should infringe his patent.

REVIEWS.

BESSEMER STEEL ORES AND METHODS. Compiled and Arranged by THOMAS W. FITCH. St. Louis Mo.: Morrison Renshaw, 515 Pine street, 1882.

This work, which is destined to be a standard one for reference, embodies new facts and statistics relating to the types of machinery in use, the methods in vogue, cost and class of labor employed, and the character and availability of the ores utilized in the manufacture of Bessemer steel in Europe and the United States, together with opinions and excerpts from various accepted authorities. The first section relates to the quantity, quality and cost of the iron ores of the United States and European countries, and the manufacture of spiegeleisen, followed by a description of the methods in the production of steel as pursued in this country, Great Britain and Belgium. The Basic-Bessemer process is subsequently fully detailed, and the latest improvements noted, improvements which render it a commercial success. This progress is particularly illustrated in an account of the plant of the Harrison Steel Company. The conclusion, under the title of "The Steel Empire," anticipates the possibility of a still further conquest of steel from the realm of other metals. The compiler bases his confidence for its limitless application on the ground that high grade steel may be produced with about one-fourth the fuel and one-third the labor required in the manufacture of rolled iron; and that steel is preferable to iron for strength and endurance. Mr. Fitch, the author, has a high reputation as thoroughly versed on the subject of the manipulation of steel, and the work consists of papers prepared at the request of the Miners' & Manufacturers' Association of St. Louis, which are published in deference to the opinion of men largely engaged in the steel business, of their practical value.

THE MODERN HOUSE-CARPENTER'S COMPANION AND BUILDER'S GUIDE. By W. A. SYLVESTER. Boston: A. Williams & Co., 283 Washington street. ($1.25).

There are several well-known and very comprehensive carpenters' text-books, but besides being too bulky for workmen to carry and too costly for their means, these have large sections devoted to complicated work, involving advanced geometrical knowledge, not called for in ordinary practice. The present work, the author of which is a practical carpenter, is of pocket size and is replete with illustrations and descriptions of the way to carry out useful jobs that fall within the province of all carpenters. We may mention incidentally that it includes directions for the construction of French and mansard roofs, and several forms of trusses, stairs, and splayed and circular work. Rules and items such as every carpenter and builder will value are in abundance; and care has been taken to render them absolutely reliable. Serviceable tables are furnished. It is convenient to carry round, and owing to its merits, will doubtless have a good run through the carpentry shops of the country.

ALMANAC FOR 1883. E. L. HARPER & Co., Cincinnati.

E. L. Harper & Co., the eminent pig iron ore and rail merchants of Cincinnati, have forwarded us the illuminated almanac of their house, each month's dates being tabulated in different colors. It is highly ornamental for office use.

Dangers of Electric Lighting.

Engineering and Mining Journal: In the mill mutual insurance companies in New England there were 61 establishments lighted by electricity up to last May. With few exceptions, the lights had not been in use previous to the fall of 1881, and many had been started early in the spring. Mr. C. J. H. Woodbury records twenty-two fires due to electric lighting, and assignable to the following causes: Eight were from globules of melted copper or particles of hot carbon falling out from the bottom of the globes. The actual number of fires from this cause was probably many times this number. This class of fires will not continue to happen, as all makers now set their lamp globes in a tight stand with a ridge around the edge. A flat plate will not answer the purpose, as there was one instance where drops of melted copper rolled off and set fire. Four fires were due to leaking water or washing floors, and two more were caused by water in a dye-house condensing on the building, to which uninsulated wires were fastened. In most of these instances a grounded circuit formed one of the two connections necessary to divert the electricity from the wires. Many of the lower carbons fell from lamps, and five fires were caused where they fell upon combustible material. Three fires were caused by cross arcs from one wire to another where uninsulated wires were fastened against conductors. In one instance the conductor was formed by dust settling upon uninsulated wires, and on a damp day it absorbed enough moisture to form a path for the formation of a cross arc, which started a slight fire. In another instance the wires were fastened to a damp beam, which was decayed, and was burned nearly in two by the smoldering fire. And, in a third instance, damp brick work in a tunnel was a sufficient conductor to establish an arc, which did not do any material damage there, but injured the dynamo. Two fires were caused by improper switches, two by water reaching the wires of a circuit already grounded, and one from wires coming in contact with a building so that their insulation was worn away. Electricity forms the safest method of illumination when the following precautions are observed: The system insulated throughout, so that there is no electrical communication with the earth, or from one part of the apparatus to another, except through the proper conductors, even if the wire should be exposed to water, all switches made with lapping connection, so that no arc can be formed; arc lamps provided with globes closed underneath, and the frame so arranged that the lower carbon could not fall out even if the lamp failed to hold it securely; the wires of incandescent system provided with a sufficient number of fusible links to secure the system against damage from excess of current.

An Electro-Generative Stone.

Mr. Brard, of La Rochelle, who has been experimenting with the view of producing an electro-generative stone (furnishing at the same time heat, light and electricity), recently described before the French Association for the Advancement of Science, what he calls an electro-generative slab. This slab consists of a brick of carbonaceous matter, and a brick of nitrate of soda or nitrate of potash, the two parts being separate and enveloped by thin sheets of asbestos paper. The carbon brick is formed of about 100 grains of coal-dust kneaded into a paste with tar or molasses. This paste is shaped under heat in a mold, which gives it a pitted surface above, and perforates it with holes from the upper to the under side. Strips of brass or copper are also imbedded in the under side of the brick, to serve as an electrode for the carbon pole of the electro-generative element. The other brick consists of a mixture of three parts of ashes, with one part of nitrate of potash or soda, melted together and poured upon the pitted surface of the carbon, which, however, is first covered with a layer of asbestos paper. Strips of brass or copper are imbedded in the nitrate, and the whole is enveloped in a sheet of asbestos paper. When placed in a fierce fire, the carbon of a slab thus made forms the negative plate, and is oxidized just as zinc is oxidized in the ordinary voltaic cell, the nitrate of potash being the oxidizing substance. The perforations in the carbon are intended to facilitate combustion, and to multiply the points of contact of the carbon with the nitrate. The ashes are used to prevent the slab from melting. A single slab will last from an hour and a half to two hours, and the electric current obtained is strong enough to actuate an ordinary electric bell. Several slabs can be burned at once, and be grouped in tension or in quantity. Three or four slabs in tension will decompose water.

Usefulness of Trade Journal.

The encouragement of trade journals augers well for the advancement of manufactures. No matter how skilled may be a workman, his fellow-craftsmen possess secrets of which he is ignorant, and which can, as a rule, only receive their proper dissemination by being published in the specialty or technical papers that are doing so much for the elevation of the American artisans and their numerous callings, in which the public is so intensely interested. Every mechanic who prides himself in his particular line ought to subscribe regularly to a trade journal—one representing most closely the branch of work in which he is engaged. This should be read closely and carefully, and the hints and suggestions thrown out must be noted with the view of giving them practical tests. By pursuing this commendable course, a greater degree of technical skill is acquired at a trifling expense of time, and a small outlay of money. Besides all this, the general news of particular localities as to the progress thereof is an especial feature characterizing these papers, of which sight cannot be lost without detriment to the loser. To be well posted is as much stock in trade with a mechanic as it is to a merchant or a professional man. The trade journal is, under wise and careful guidance, as much of a necessity as the daily paper.

The Dairy Industry of France.

To give an idea of the dairy industry in France, M. Herve Mangon recently stated (at an agricultural gathering) that the milk produced in that country would, if collected, form a stream about one metre in width and thirty-three centimetres in depth (say three feet four inches and one foot one inch), flowing night and day all the year, with the mean velocity of a metre per second. Young animals drink a part of this enormous volume of milk, man takes a good portion of it, and the rest is transformed into cheese and butter. No branch of agricultural industry has so advanced during the last fifty years as the making of butter. In 1833 France bought abroad 1,200,000 kgr. of butter, and sold to foreigners only 1,109,000 kgr. She now exports thirty-four to thirty-five millions kgr. of butter annually, and receives in return from abroad (especially from England) a sum of more than one hundred million francs. La Manche alone furnishes more than one-third of the total exportation. (A kilogramme is equal to two and one-fifth pounds avoirdupois).

1882. Christmas. 1882.

Excursion rates for the Christmas holidays, to and from all stations on the lines operated by the Pennsylvania Company. In accordance with its time honored custom, the Pennsylvania Company sends a Christmas greeting to its patrons and the general public, with the information that cheap excursion tickets will be sold to and from all stations on the Cleveland & Pittsburgh R. R, December 22, 23, 24, 25, 29, 30 and 31, 1882, and January 1, 1883. All tickets good for return passage until January 3, 1883. The rates will be made exceedingly low, affording everybody an opportunity to spend the Holidays among relatives or friends at a distance or to visit the large cities and other points of interest on the lines controlled by the Pennsylvania Company at a very moderate expense. Agents of the Company will cheerfully furnish time tables of trains, rates of fare and all desired information upon application.

THE excess of imports of merchandise for the twelve months ended October 31, 1882, was $10,805,230. The value of exports of gold and silver coin and bullion for the same time was $33,273,089. The value of imports of merchandise for the same period was $751,975,569.

MARKETS.

Office of TRADE REVIEW AND WESTERN MACHINIST.

FRIDAY EVENING, December 15.

FINANCIAL.

The supply of loanable funds is large. There has been increasing activity in the demand for money, and a steady rate of 7 to 8 per cent. is maintained. The rate is 6 per cent. on call and 5 per cent. on time. There has been a considerable call for money for shipment. Local securities are firm. Government bonds are firm. Foreign exchange is more active, and rates have advanced ½c. to the pound.

IRON.

The apprehensive feeling that lately prevailed has been considerably modified. Makers of favorite brands have no difficulty in disposing of their output a month to six weeks ahead, but less popular brands, though freely offered, move slowly. The output of standard brands of Foundry is being readily absorbed by contract orders. There have been moderate transactions in Scotch irons. We quote Coltness $25.50@26, Glengarnock $22.50@23.50; Gartsherrie $25; Summerlee $25.50@$26; Carnbroe, $23; Eglinton, $22.50; Langloan $25.50@$26 Bessemer pig is variously quoted at $22@$22.50. For bar iron there is a gradual slacking up as the season advances. The mills for plate iron are offering lower prices. Sheet iron is in good demand. There continues a pretty fair demand for steel at unchanged quotations. In wrought pipes, buyers are indisposed to place orders until assured that bottom prices are reached. For structural iron no large orders have been placed, but inquiries are on hand for spring delivery. Scrap continues quiet and prices are easy without quotable change.

CINCINNATI.—Reported by Rogers, Brown & Co. --A better feeling pervades the pig iron market. Current business continues light, but a feeling prevails that the bottom has been reached in prices, and that the beginning of the year will witness a sharp buying movement. It is certain that stocks in furnace and consumers hands are lighter than usual at this season, and that consumption in the aggregate is not diminished. A number of considerable contracts for railway equipment have been given out in the past few days and something like the old time activity in car building circles is the result. No improvement, however, in prices of wheel iron is felt yet. Nevertheless stocks are being reduced. It is estimated that the sales of the large Southern coke furnaces now entered for forward delivery will equal their entire output until April 1st. Some have contracted 50 to 75 per cent. of their product for 1883. We quote for cash: Hot Blast Foundry.—Hanging Rock, C. C., No. 1, $25.00 @ $26.00; Hanging Rock, C.C., No. 2, $23.00@$24.00; Southern No. 1, $24.00@$25.00; Strong Coke No. 1, $22 50@$23;50; Strong Coke No. 2, $22 00@$22.50; Strong Coke No. 3, $21.00@$21.50; Soft Stone Coal No. 1, $22.00@22.50; Soft Stone Coal No. 2, $21.00@$21.50. Forge—Strong Neutral No. 1 Mill, $21 00@$21.50; Cold Short No. 1 Mill, $19.50@$20.50. Car Wheel and Malleable—Hanging Rock C. B., $31@$33; Hanging Rock W. B., $25@$27; Southern Car Wheel Iron, $29@$31; Lake Superior Car Wheel Iron, $27@$30; Lake Superior Malleable, $27@30.

CINCINNATI—Reported by E. L. Harper & Co.--The current demand for pig iron is up to the usual requirements of the season, and while a dullness generally prevails at this period of the year, it is gratifying to know that the consumption has not materially lessened. There is no change in prices worthy of note since our last report. We quote for four months: Foundry.--Hanging Rock Charcoal, No. 1, $25.50 @ 26.00; Strong Neutral Coke, No. 1, $24.00@25.00; American Scotch, No. 1, $22.00@23.00. Grey Forge.—Neutral Coke, $21.00@22.00; Cold Short, $20.50@21. Car Wheel and Malleable.—Hanging Rock, C.B., $33.00@35.00; Hanging Rock, Warm Blast, $27@28 Lake Superior 1 and 2 $27@28; Lake Superior, 3 to 6, $28@30; Southern Car Wheel, $32@33.

HARDWARE.

Large orders have come in for hardware appurtenances for agricultural, wagon-making and blacksmithing operations. There is a good run on cutlery. The tone of the market is firm. Makers of nails are still busy on old contracts. Prices unchanged at $3.50, 60 days, 2 per cent. off for cash and the usual abatement of ten cents per keg on carload lots and upward. There has been no important revision of price lists or discount sheets.

LEAD.

The feeling has improved and we report recent sales in a small way at 4.40@4.50c. We quote for moderate lots of Common 4.40, and for Refined 4.50. St. Louis' quotations are 4.25c. for Soft Missouri and 4.12½c. for Hard Lead.

COPPER.

The market is somewhat easier. Small lots of Lake Ingot have been offered as low as 18c. Baltimore and Western copper is nominally quoted at 17¾@17½ asked. London cables £74@£74 5s. for Best Selected.

TIN AND TIN PLATES.

The weakness of the market for tin in London has depressed prices here. Holders have asked 22¾ to 22¾ cents for Straits and Australian in a jobbing way, but round lots would have been difficult of sale at 21¾. London was last cabled £95. We quote for jobbing lots Banca 28 cents, Straits and Malacca 21¾ to 22¼, Billiton 22¼, Australian 21¾ to 21¾, English L. & F. 22¾ and English Refined 22¾. The market is quiet for all grades of tin plates. There has been no change in spot prices, but future business can be done at a considerable concession, particularly Charcoal Tins and Ternes, which have been offered very low, while Cokes have shown a steadier feeling.

ANTIMONY.

Business is quiet and unchanged at 12¼@12¾c. for Cookson's, and 10¾@10¾c. for Hallett's.

COAL.

Prices are unchanged, but there is a firmer feeling. Deliveries during the week have been large.

WOOL.

The wool market has been quiet and rather irregular. In washed fleeces, sales have been made of Ohio XXX at 45c., Ohio X at 41c.; No. 1 Ohio 45@46c. Sales of combing and delaine fleeces comprise No. I Ohio at 48c.

OIL.

So suspensive is the condition of the oil market, that the opening of a new well has sufficed to paralyze operations. The market after climbing to 95¾ cents, closes at 91½ cents. Carrying rates are $1.50

LUMBER.

PLANK, MIXED WIDTHS.
2 inch, 12, 14 and 16 feet, together.

A 1 and 2 uppers	$50
A 3	40
B	32
C	20
D	14
E	12

1¼ and 1½ inch.

A 1 and 2 uppers	$48
A 3	40
B select	32
C	20
D	15
E	13

BOARDS.
One Inch, mixed widths.

A 1 and 2 uppers	$44
A 3	36
B select	30
C	19
D	14
E	12

STOCK BOARDS.
12 Inches wide.

A 1 and 2 uppers	$45
A 3	38
B	32
C	21
D	16
E	13

STRIPS.
6 Inches wide.

A 1, 2,	$42
B	32
C	22
D	16
E	12
Norway Fencing Strips	17
Norway Flooring Strips	25

WORKED LUMBER
FLOORING.

Flooring—A 3	$42
B	35
C	24
D	20
Norway Flooring—A 3	28
C	22
D	18
Matched Drop Siding, 6 inches—A 3	42
B	38
C	24
D	20
Beaded Ceiling $2 higher than F[illegible]ooring.	
One half inch Bevel Siding—A 1 and 2	24
A 3	20
B	18
Ash Flooring—A 1 and 2	40

BILL STUFF

Small, joists, 12, 14 and 16 feet	$14
Timber, longer than 20 feet [illegible] over 34	00@$6 00
less than length.	
Cedar Posts, large	30 00
" " medium	25 00
" " small	$15 to 20 00

SHINGLES, LATH AND MILL WORK

Shingles XXX	$ 4 25
Clear Butts	3 25
Lath	2 75@3 00

Surfacing, one side, add [illegible] two sides $1.50
Matching, flooring and drop sidings, $2.25.